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MEETING OF THE AGRICULTURAL COMMITTEE ALBERTA LEGISLATURE MARCH 17, 1930.

Report by Dr. Robert Newton on

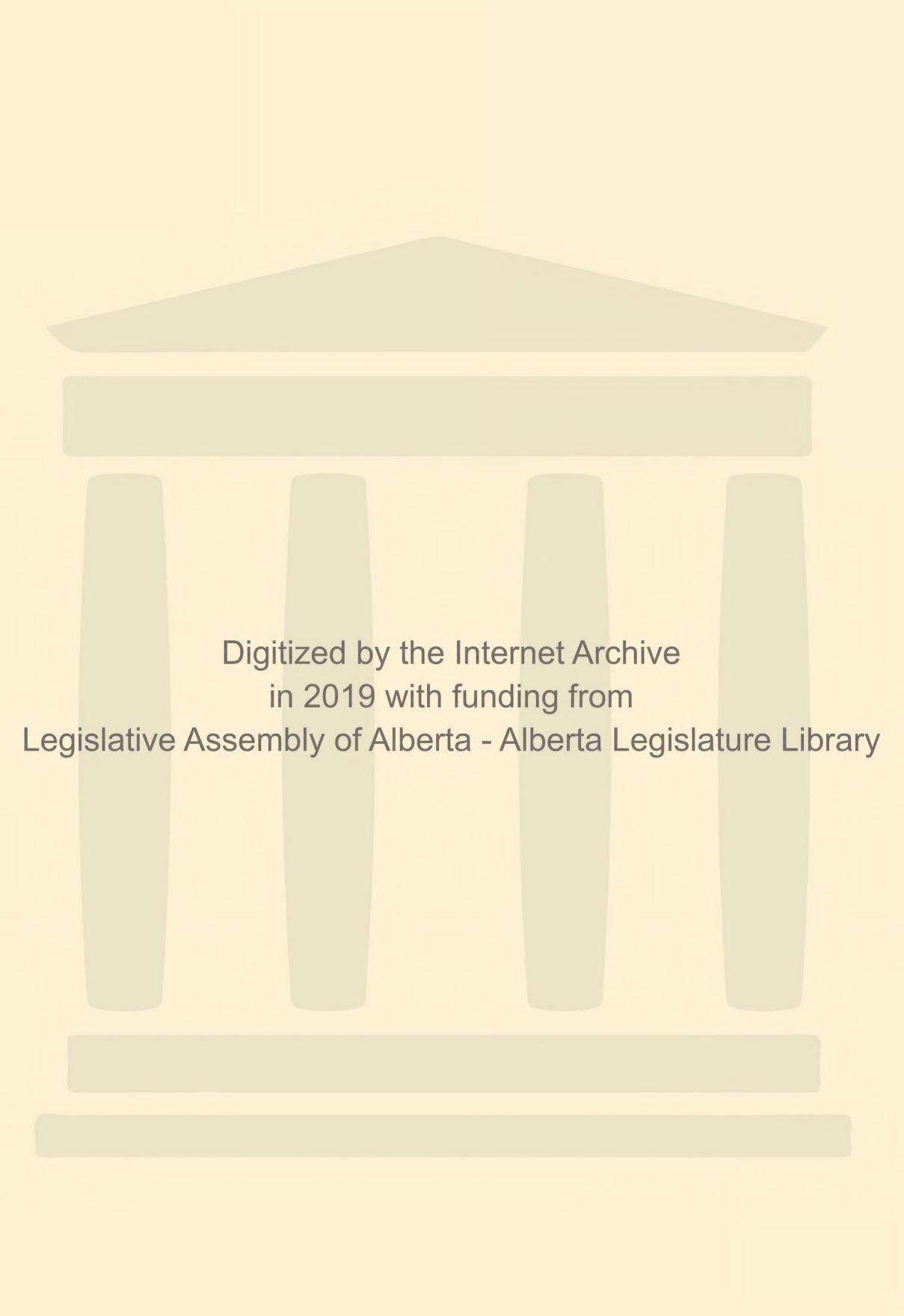
"The Feasibility of Using Protein Content as a Factor in Grading and Marketing Canadian Wheat".

Resolution re "Oil and Gas" - Mr. Nelson Smith.

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Attention drawn to price of Building Materials. Mr. Proudfoot.

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MEETING OF THE AGRICULTURAL COMMITTEE of the Alberta Legislature March 17, 1930.

Report by Dr. Robert Newton on

"The Feasibility of Using Protein Content as a Factor in Grading and Marketing Canadian Wheat".

Chairman: - Mr. Donald Cameron.

Dr. Mewton:

As you all know the feasibility of using a Protein test in growing and marketing wheat has been considerably discussed in the United States and consequently when I was asked through the National Research Council a year or two ago to make this enquiry naturally we directed our first attention to the situation in the United States. We investigated that a little over a year ago. This morning I shall not refer to that early investigation except the two or three points in comparison with conditions in the United States and Canada.

There are some points which contrast rather largely. first is the United States uses at home approximately 80% of its total wheat crop, whereas Canada exports approximately 80% of its total wheat crop. That is a very significant matter because it means at once that we have an entirely different market, an entirely different set of marketing conditions to meet, and it is more significant when we remember that the demands for wheat and flour in Europe where we market most of our wheat are distinctly different to at home. Our home consumption is similar to the United States and consequently if we were marketing wheat at home in the same way as they are we might conclude that that which is good for them is good for us, but that is not the case. We are marketing on a market where demands are different.

Another point of contrast is that the wheat crop of the United States averages distinctly lower in protein content than does the wheat crop of Canada; therefore if protein is in demand and the market is controlled by the usual law of supply and demand, the supply is more restricted in the United States and the demand more keen, they would be willing to pay a premium for high protein wheat.

The third point of contrast in the United States is by reason of the fact that they market at home, the market is almost entirely a sample market, and it is a case of merchants selling directly to millers and millers examining samples of wheat and taking into consideration all the various characteristics of that sample including protein content. We have a vastly more complicated system. It is unusual for a merchant to sell direct to the millers but the merchants this side of the water are selling to merchants on that side of the water who in turn sell to the millers, so at least one more step is put in there. That may be to some extent cut out by the Wheat Pool. The Wheat Pool does market some wheat direct to the millers but we have that trade complication coming in that does not obtain in the United States to the same extent.

Coming more particularly to the enquiry I made last Fall in Europe, I would like to direct your attention to protein content as baking strength because after all that is the measure, the relation between protein content and baking strength, and we have der consideration the proposal to sell our wheat on that basis.

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From the point of view of the kind of breæd we bake here in Canada, and the kind of bread baked in the United States there is a distinct relation between protein content and baking strength. The protein content is that part of the wheat of chemical composition which provides the structure of the loaf of bread. You mix flour and water and get dough, but by reason of yeast there is germination and because that dough is blown up by yeast in the interior, if, like the elastic band it is of good quality it will stretch a long way, but if it is short, larger holes will be formed and the gas will escape. That is the strong loaf we prefer in this country. There is, however, quite a distinctly different demand on the whole in regard to bread used in Europe. On the whole they use a weaker blend of flour. They do not attach the same importance to size of loaf; in fact they prefer smaller loaves with closer grain and mellower texture. our loaves described by European millers as being rough and harsh. Some described it as full of wind but that was said jokingly but illustrates the difference in type of demand.

Now they do not need such a strong flour to make that type of loaf, but as their local flour and Pacific White Wheat flours are not strong enough to make even a satisfactory loaf from their point of view, consequently they must import strong wheat flour such as ours to blend with it to give it a little more "lift" as they call it. Since they actually buy our wheat for "lifting" and strengthening different flours they ought to be interested in protein content because a smaller quantity of high protein sample results without increasing the measure as a larger quantity of lower protein wheat. Nevertheless I found a great many objections to the proposal to buy Canadian wheat on the basis of protein content. They objected in the first place that protein test gives only a measure of the quantity of gluten present but not quality.

That objection is easily understood coming from European millers because they are used to dealing with a wide range of wheats. They have White Pacifics, they have the Australian wheat, the Indian wheat and the Argentine wheat all of various grades and qualities. They have a great variety of types to deal with and when comparing two distinct types the protein content quantitatively expressed does not give you much information from the strength standpoint of the quality because it may vary extremely widely, and of course that is the situation that confronts the European miller. He is used to dealing with all these types of wheat and he wants to know the content and also the quality which he determines in various other ways.

They seldom use in Europe our chemical tests of protein. They use the "washed gluten" process. The starch and soluble material are washed out of a sample of dough kneaded under a stream of water. The weight of the residual mass of gluten gives the necessary information in regard to quantity, and a skilled operator can also form a fair estimate of the quality by the handling properties of the wet gluten, and by the form, wrinkling and colour which it assumes on drying. They get a fair idea of its quality and they attach more importance to that kind of a test and are inclined to discount our chemical test of protein.

It was almost impossible to persuade them they were getting protection from grade. Specifically the proposal made was to supply only the contract grades; No.1, 2 and 3 and perhaps might include 4, but under the contract grades that only wheat varieties of good milling quality shall be allowed into the grade. Marquis is taken as the standard and only wheat which equals Marquis must be admitted to these grades. These grades must essentially be sound. A small amount of frost may be allowed in No.3 but essentially they are sound wheat grades. Now when you

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limit your test of protein to these grades you are protected in regard to quality factor simply by reason of the fact that Marquis wheat well ripened and sound, will always have good quality. The gluten may vary from sample to sample but never poor if well ripened and sound, and consequently they have that protection to start with and on top of that they have the measure of quantity determined by chemical tests, then you have the information we regard as of value. That seems to us entirely logical and that point of view is accepted by some European chemists, particularly those who have spent some time in Canada and the United States and gotten a grasp of the situation, but in regard to most of them it was absolutely impossible to persuade them of the soundness of that point of view.

I will direct your attention to a few of the things I observed in some of the countries I visited, beginning with England, because England takes the larger quantity of our wheat, more than any other country. I think it is perfectly true that innate conservatism on the part of English millers is responsible for their attitude towards this proposal. I could not put across the idea of this protein test as a measure of quality. However, there are some other very real reasons why they object to the proposal.

I have already intimated that they make up their milling mixtures from a wide variety of milling wheat. Strength, as reflected in protein content, is only one of several important factors they must consider. There is the question of milling yield and again and again my attention was drawn to the fact that the value of high protein wheats is very frequently offset by the fact that the wheat per measured bushel is often less and the actual percentage of flour is less from a high protein wheat than from a starchy sample and that is offset factor they must consider; not only quality but quantity of flour they get out of the wheat.

Those of you who have looked into actual comparative market prices of wheats on the Eritish Market will notice that Australian wheat commands a higher price than our No.3 Northern, and has for a number of years. Australian wheat is a weak, starchy wheat but there are three points that increase its value. of all it has a bloom which gives it high milling value. flour is usually much drier than ours; contains less moisture and that difference in moisture content is enough to account for a number of shillings per quarter. In addition to the actual difference in value due to the difference in moisture content of Australian wheat there is one particular quality, viz., the very excellent colour of the flour; not only a whiteness but a brightness; There is a distinction there and they always like to have Australian wheat in the mixture by reason of its brightness and we find Australian wheat commanding a higher price than our wheat. I mention that to illustrate the point they raise that strength is only one factor and that they are opposed to singling out any one factor. They do not deny protein content is important but say it is not more important than some of these other things and should not be singled out as the factor to be given outstanding consideration.

In this country and the United States, millers commonly mill their flours to a definite chemical standard; that is, they will insist on a standard of 12% protein content in one grade of flour and make it measure up. Another way they turn out flour of a certain protein content is that it will be for commercial bakers flour 11 1/2%, and another percentage for household use sold in the retail trade and as a matter of fact, some of the large bakeries, especially in the United States, specify not only the exact protein content but specify the ash content as that gives the measure of closeness of milling, that is it is in

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In England as a whole, though it varies slightly from part to part, they like to use about 40% of Canadian wheat or Manitoba wheat in their milling mixture. They cannot use much over 45% but they will use 45% if it is relatively cheap. They used to bake bread with flour that contained up to 80 or 90% Canadian wheat but their tastes have changed, their methods of baking have changed and no longer can they use a high percentage like that. A year or so ago, when our wheat happened to be comparatively cheap as compared with other wheats they were buying, one miller tried to use 70% of Manitoba wheat, but the bakers complained the crust was leathery, and the dough was not mellow, and he had to go back to the 45% in order to satisfy the customers.

One of the bakeries that is of particular interest since Lyons was the firm of bakeries that was said to be advertising they used no Canadian flour, is this London firm. When I saw that in the paper I knew that must be a mistake because I had visited them myself and knew they were keen on using all the Canadian flour they could get, and this last year the percentage of Canadian wheat that Lyons imported had gone up, and they had said "we are maintaining the quality of bread by importing Canadian milled flour." I saw "Lake of the Woods" flour, for example, stacked in their warehouse and they showed me figures to show that the proportion of Canadian wheat used by them had gone up as the proportion used by other millers had gone down.

The manager of a bakery told me last year sometime he thought he would make an experiment to see if the customers would be better pleased if he used a larger percentage of Canadian flour and made a larger loaf but again he got compalints that the crust was tough. They wanted their standard mellow, close textured loaf they were used to and objected to any change, although we would regard it as an improvement. There are certain fixed, conservative tastes in England we cannot overcome easily and in order to satisfy the taste the millers like to use about 40 to 45 per cent. Manitoba wheat in the milling mixture.

While I was there in September and October of last year the use of Canadian wheat was falling off rapidly. Some millers who had been using from 40 to 45% dropped to 25% and 10% and a few were using none at all. The situation was that of supply and demand. The price of Argentine wheat was lower than Canadian because of the fact the Argentine had an unusually large crop and what was a more unusual coincidence the Argentine wheat crop in addition to being unusually large was of a better quality and better in actual strength. It does not usually work that way. When we have a heavy rainfall and a big crop normally the yield goes up and the quality goes down so it was an unusual coincidence

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that the Argentine should have an unusually large crop of an exceptionally fine quality. One particular class, Bahia Blanca, comes from the southermost part of the Argentine which has a climate about like ours. That wheat is said by some millers to be equal to Canadian wheat in quality. I doubt if that is absolutely true because I went into that point carefully with cereal chemists and found it was undoubtedly good in quality but scarcely equal to ours. The cheaper wheat and the relatively high quality naturally cut down the quantity of Canadian wheat they were using because the price of Canadian wheat did not drop correspondingly.

Another unfortunate result of that condition was it hastened to accelerate a change in baking methods. There has been a tendency to change in baking methods in the Old Country. They used to bake mainly dutch loaves and what happened was this. doughs had no support and had to be made of relatively strong blends to stand up. They have introduced pans a lot more and I have no doubt that introduction of pans was accelerated by a shortage of Canadian wheat and they used pans to support the sides of the dough so it is unnecessary to use as strong a mixture of flour as they used to use. With the long fermentation process it was mixed the night before and there was several hours fermentation. Now they are using a shorter fermentation process and do not need such strong flour. It takes a strong flour for a long fermentation process and a strong flour will hold the gas for a long time. That tendency in change of method was accelerated by a shortage of Canadian Wheat. That means again a further restriction in potential market if they continue to use the shorter fermentation process which simplifies the labour problem, and also makes possible the use of weaker blends of wheat which is usually more economical. The drastic reduction made last year in proportion of Canadian wheat used in mixtures did not take place without actual deteriation in the bread. Lyons imported more Canadian flour to maintain the quality of the bread but the other bakers did not do so and I found a lot of complaints from the bakers that this has depreciated the quality of flour the British millers are turning out and some people right on the Grain Exchange in London told me the bread in England was no longer fit to eat. No doubt that is an exaggeration but it was sufficient to satisfy me there had been actual deterioration in quality of the bread in the reduction, the drastic reduction in the amount of Canadian wheat used, and no doubt they will use more of it to get over that deterioration as soon as the price conditions make it possible.

There have been proposals from various quarters as some of you know, that a Canadian Demonstration Bakery should be demonstrating in London, using Canadian methods of baking. I made a number of enquiries about that to try and get a line as to whether it would be likely to be successful. It was impossible to find any unanimity of opinion as to the possible value of such an undertaking but most of them rather discounted its value.

The limitation in the percentage of Canadian flour that can be used is decided outside of the economic conditions, by actual taste they have for bread and methods of baking they use, and they cannot use more than 45% of our wheat without complaints from consumers of bread. They have not high speed electrical mixers. There are only about two in Europe. In this country they are almost universal and in baking practice break down the physical structure of tough doughs made from strong flours. If that type of machinery were introduced it would make it necessary they make a stronger mixture. However, from their point of view it does not seem necessary to introduce machinery which would make it necessary they buy a more expensive type of wheat, and I am doubtful if a single demonstration bakery would have much effect on the market as a whole. I think the market is too

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big and complicated and varied although the idea behind the proposal is a good one and worthy of consideration.

There is another point which was brought to my attention. Last Fall was perhaps an inauspicious time to conduct such an enquiry as to whether or not they were interested in protein content as a factor in buying our wheat, because the amount of Canadian wheat was rapidly falling off and the interest in any commodity is the necessity for it. They were buying the weaker flours and there was less interest in the proposal than there used to be because so much less Canadian wheat was being used. The consensus of opinion in England was against protein testing.

I put some formal questions to the National Association of British and Irish Millers which they considered carefully in committee meetings and gave their answer in which they said in brief "This Committee recognizes that Canadian wheat realizes relatively high prices because of its characteristic inherent qualities, but in our opinion a guarantee of protein content in standard grades would present difficulties without compensating advantages". There are a number of trade complications that Canada and the United States are the only countries would occur. which have a "certificate final", a certificate which is issued by our inspectors, a certificate the purchaser has no recourse In connection with other countries there is a system of adjustment. Australian wheat is sold on a fair average quality and any particular shipment below the average quality can be taken before the Board of Appeal and they will arbitrate between the buyer and the seller and give a judgment as to whether or not there should be a discount on that wheat. The same is true of the Argentine wheat which is sold on the basis of an average weight per bushel and if it falls below that average weight appeal is made, and adjustment can be made between the buyer and seller, but no such adjustment is possible with regard to Canadian and American wheat and that seemed to be a sore point with many of these buyers and millers and a suspicion of the introduction of any other system of marketing which might lead to complications. They insist, if sold on protein test there must be laboratories on their side of the water to which they can submit samples and make appeals if samples are not up to the protein content specified. They pointed out the "certificate final" does not represent the grain they get as it is issued at Fort William, the grain goes to Montreal where it may be mixed with other lots of the same grade and consequently when it actually reaches the Old Country and is handed to the buyer they may get an entirely different lot of wheat; the identity may be different to the wheat in connection with which this certificate is issued. That would be an impossible situation in marketing wheat by protein content. If there was guaranteed a certain lot, a certain content, that would have to represent a sea-board test and a guarantee that that would be delivered to the merchant on the other side.

Another complication is that practically all the wheat is bought in the first instance as futures, about three months in advance and it is a matter of considerable doubt and difficulty whether protein content of future deliveries can be guaranteed, or whether protein content can be taken into account on an Exchange.

Small millers have their difficulty in that they have little storage space. There are two types of grain market in England. They have first of all the Main Exchange in London and the Corn Exchange in Liverpool divided into two halves, one half in which merchants are buying futures, and across on the other side of the Exchange these same merchants are now re-selling to millers, and that is a sample market. On that sample market it would be possible to take the protein content if the merchant had any way

TOTAL CONTRACTOR OF THE CONTRA of storing it. He could not guarantee on a sample market unless he guaranteed that on future delivery. The small miller who has not much storage capacity in his mill has to order about a week in advance of his requirements, and he always orders delivery from some ship already on the ocean on which the date of arrival is known, and he has to buy from that ship. He has to do that whether the protein content is suitable to his needs or not. He cannot afford to wait until another ship comes in for the protein content he wants.

Some of these remarks are general remarks that apply to all the other countries, but just a few remarks about the other countries and condition in relation to the possible marketing of wheat by protein content.

In Scotland they use in proportion to the population more wheat than they do in England. In England, as I pointed out, the blending is done by the millers. They get wheats from all over the world and blend to produce a flour of definite physical or baking behaviour. In Scotland they get wheats from different parts of the world, but they mill these wheats straight and the flour is handed on to the bakers, and the baker does his own blending and they use a lot more Manitoba wheat there than in England in proportion to the population.

In Scotland they use the long fermentation period. In England it is from 3 to 6 hours, in Scotland from 12 to 18 hours and consequently they must use a very strong flour. In Scotland, as elsewhere last year they had replaced by Gulf Hard Winter, the American Kansas wheat which is the closest rival to hard spring wheat because it is nearest like it in physical properties, and by Argentine. Even in Scotland I found the trend towards shorter fermentation. One of the Scottish Co-operatives had an interesting baking competition. It is the largest milling and baking concern in Scotland and in announcing the baking competition the total amount of time allowed from the mixing of the flour and water to the end of the process was only 7 1/2 hours, very much shorter than the average time of baking in Scotland. They are trying to push things towards a shorter fermentation period when baking can be done with a weaker flour. rather strange there is a possibility of legislation against night baking which would make impossible the long fermentation process, and they would probably use a weaker blend of flour. I saw, as a matter of fact all the small millers left in Glasgow. Owing to the nationalization process most of the mills are now controlled by a few large companies. I visited the small millers in Glasgow and Edinburg and they told me they were not interested in buying by protein content because if they did buy a high protein wheat they could not get any more from the bakers as they wanted an average protein wheat, and for that reason they wanted an average wheat to mill and did not want to pick out particularly high or low protein wheats. The outstanding fact put before me was the thing they were really interested in was to have every lot of No.2, or No.3 Northern the same as the last lot and not up or down as that makes complications in their milling procedure.

In Ireland there are some features of particular interest. Ireland imports practically all of the wheat and flour which is used there as there is very little home grown wheat; only one or two per cent. of the wheat used in the country.

There are three principal kinds of wheat; retail shop flour which is 60% of the flour used in the country. This is a weak flour, milled principally from Pacific White wheat, and is used largely for the home-baking of bread with soda and buttermilk rather than with yeast. The second type of flour used is blended flours. Here again the miller is doing the blending as in England. That is used by the city bakers. The time consumed in

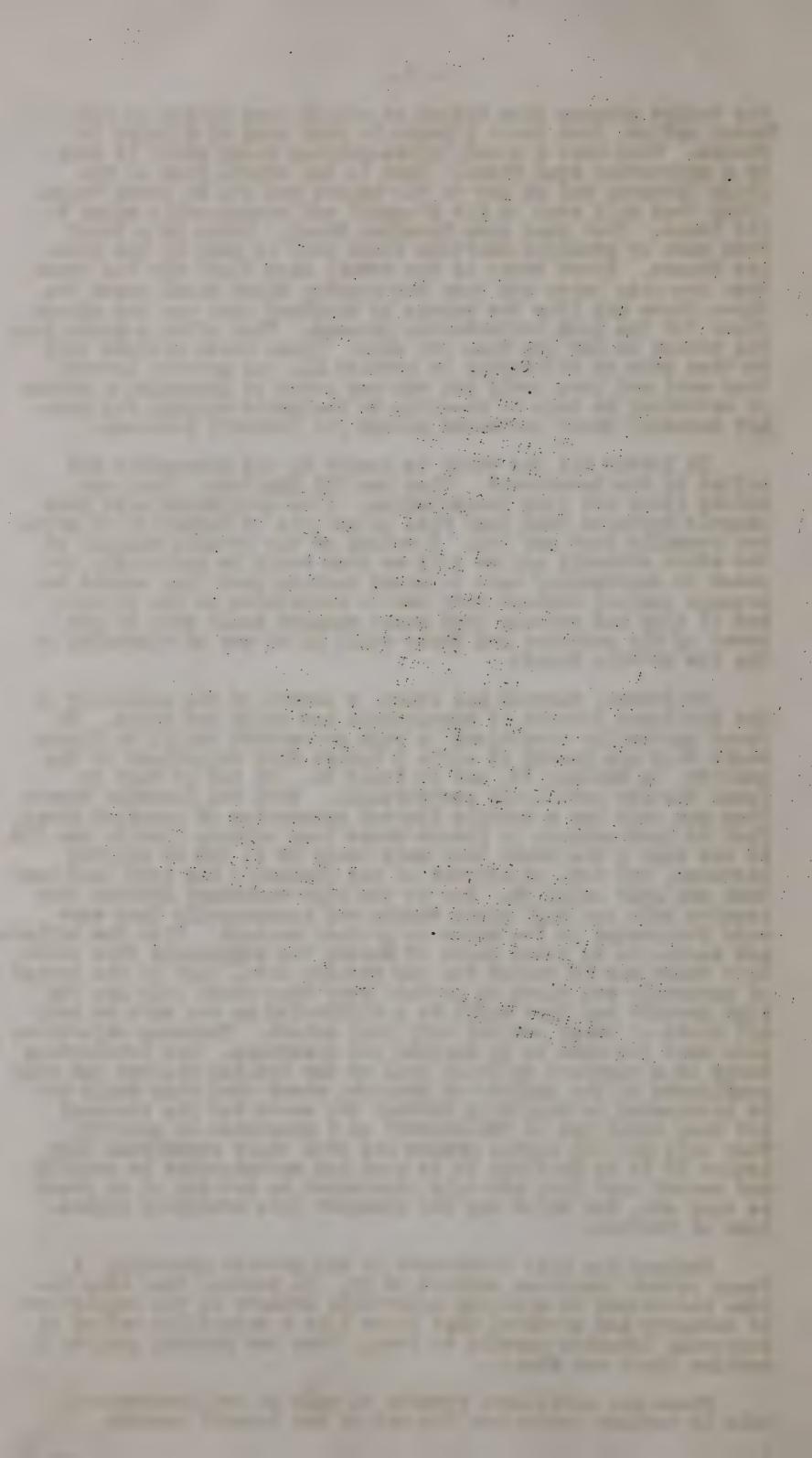
the entire process from mixing to out-of-oven varies in different cities; from about 3 hours in Cork area to 6 hours in Dublin. They want a solid, close-grained bread which is made by a moderately weak flour. That is the staple food of the Irish labourer and as one of the bakers put it, he wants "something that will stay on his stomach" and consequently cater to his taste. That uses some Canadian wheat. There is a third kind made of straight Manitoba flour that is used by the country bakers. First there is the retail shop flour for the hones, then the city baker and then the country baker which makes the three forms and like the bakers in Scotland they use the strong flour for the long fermentation process. Very often a woman does the baking in her own home for sale. These Irish millers tell me they have no difficulty in getting all the protein content they want and they could not see any point in arranging a system of marketing to make it possible to designate because the average Canadian wheat contained enough for ordinary purposes.

In Norway all the wheat is bought by the Government and milled by the Government. They use 75% Manitoba. They use strong flour and long fermentation. Like everywhere else they largely replaced that last Fall on account of disparity of price, but normally they use 75%. I called on the general manager of the state monopoly and he told me they would be definitely opposed to segregating lots of wheat because what they wanted was average quality because they had to distribute to the millers and if they had protein lots every manager would want to get ahead of his neighbor and there would be no way of disposing of the low protein wheats.

In France, Germany and Italy, a number of the countries on the Continent outside of Scandinavia are using our wheat. We found particular conditions: a high protective tariff in France where they are paying 55 cents a bushel duty regardless of the quality; in Germany 72, and in Italy 70. On top of that we found further artificial restrictions. With the domestic wheats they can only use a certain limited percentage of imported wheat. That is most extreme in France where they require them to use 97%. At the time I was there they were using 10 to 15% in milling mixtures, but now, on account of the unusually big crop last year they are only using 3%. Due to the high bushelage charges they require only our high grade wheats and consequently they were more interested on the whole in protein content. Then the millers and merchants in other parts of Europe too emphasized this point, that there was no market for low protein lots, that if the system of marketing was based on protein lots they could only pay for high protein and that would be a difficulty as you have to sell all kinds of wheat and not only your select. Numerous objections were made the same as in England and elsewhere. One interesting thing is a merchant in Italy told me the Italian millers had such confidence in the quality of Manitoba wheat that they would not be interested in enquiring further but would buy the cheapest lot they could get of "Manitobas" as a guarantee of quality. They only get the higher grades and from their experience they assume if it is Manitoba it is good and satisfactory in quality and beyond that they are only interested in getting it as cheap as they can, and would buy the cheapest lots available regardless of protein.

Germany was more interested in the protein proposal. I found rather unanimous support of it. In Germany they have become accustomed to applying scientific methods to the regulation of industry and anything that looks like a scientific method of improving industry appeals to them. They use protein quality in grading their own wheat.

These are sufficient remarks to make on the observations made in various countries; now one or two general remarks.



I have already mentioned that great emphasis was laid on the necessity of standardization of quality of grades throughout the year. They are not interested whether we mix or do not mix, and assure us the wheat will find its own level of price if standard, but point out when different shipments vary that they make allowance for it, and base their bids on the quality they think will be the minimum quality they are likely to get, and consequently we lost on account of a discount on better qualities of wheat because they are afraid it might not be up to scratch.

Specific complaints dealt with three points; first, the percentage of hard red kernels. They set a great deal of importance on hard red kernels and when they get a lot of wheat that falls down to the minimum of grade in percentage of starchy kernels they are disappointed. As pointed out to one miller they are within the law although it disappointed him, but he said if it was within the law the law ought to be changed. I found a few complaints about weight per bushel. Similarly they are disappointed if it falls to the minimum of weight per bushel. Another complaint will be overcome by this new regulation which requires out—turn samples to conform to a sample representing 75% of the average at terminal inspection point, so I take it these complaints I got will naturally not arise in future.

The other complaint I got was that the quality of the grades fell off materially towards the end of the season. One miller showed me his laboratory tests for several years and in August and September they fell off from 10 to 15%. I suppose that is the time of the year when all the country elevators are cleaned out; when all the less marketable lots that have been held back now must be gotten rid of and I suppose there is a let down of inspection at that time of the year, although when discussing with the Chairman of the Grain Commission I was told they had received complaints from sellers that inspection became too rigid. But evidently there has been depreciation at the end of the season and that puts our wheat in bad odour.

I received in other quarters requests that dis-similar varieties, unlike varities, should not be mixed. The reason for that was reports of increasing varieties in use in Canada and they were very emphatic that these varieties, if not equal to Marquis should not be mixed in the grades but that they should be shipped by themselves. They have in the English mills, and the Continental mills more elaborate equipment for conditioning than we have. They can condition three or four or more different lots of wheat at the same time, and they say if we have new varieties that are not entirely similar to our main variety then they should not be allowed to be mixed with the standard grades but should be graded separately and shipped separately.

Chairman:

I wish to extend our hearty appreciation for the very excellent and informative address on this subject that has been given to us by Dr. Newton.

Subject of Fuel Oils Re-opened.

Mr. Nelson Smith:

There seemed to be some feeling that the wording used in a former resolution was not as good as it might be, and I would move now:

"That in the opinion of this committee the Government should institute an investigation into the price of fuel oil and lubricating oils".

Mr. Irwin:

Was there not some contention as to freight rates. Should that not be included in this motion?

Mr. Smith:

I take it that freight differentials would have to be considered at all times in connection with prices.

Motion Carried.

Mr. Proudfoot brought to the attention of the Committee the prices of building materials, and suggested if it was considered of sufficient importance that there be another session of the Committee to consider the matter.

The Chairman stated he could not put it to a vote as there was not then a quorum present, many having left the room.

Mr. Proudfoot agreed that the matter should be left in abeyance as the Session was drawing to a close and some time might be required for investigation.

Certified a transcript of my shorthand notes.

Emma W. R. Jones, Reporter,

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